

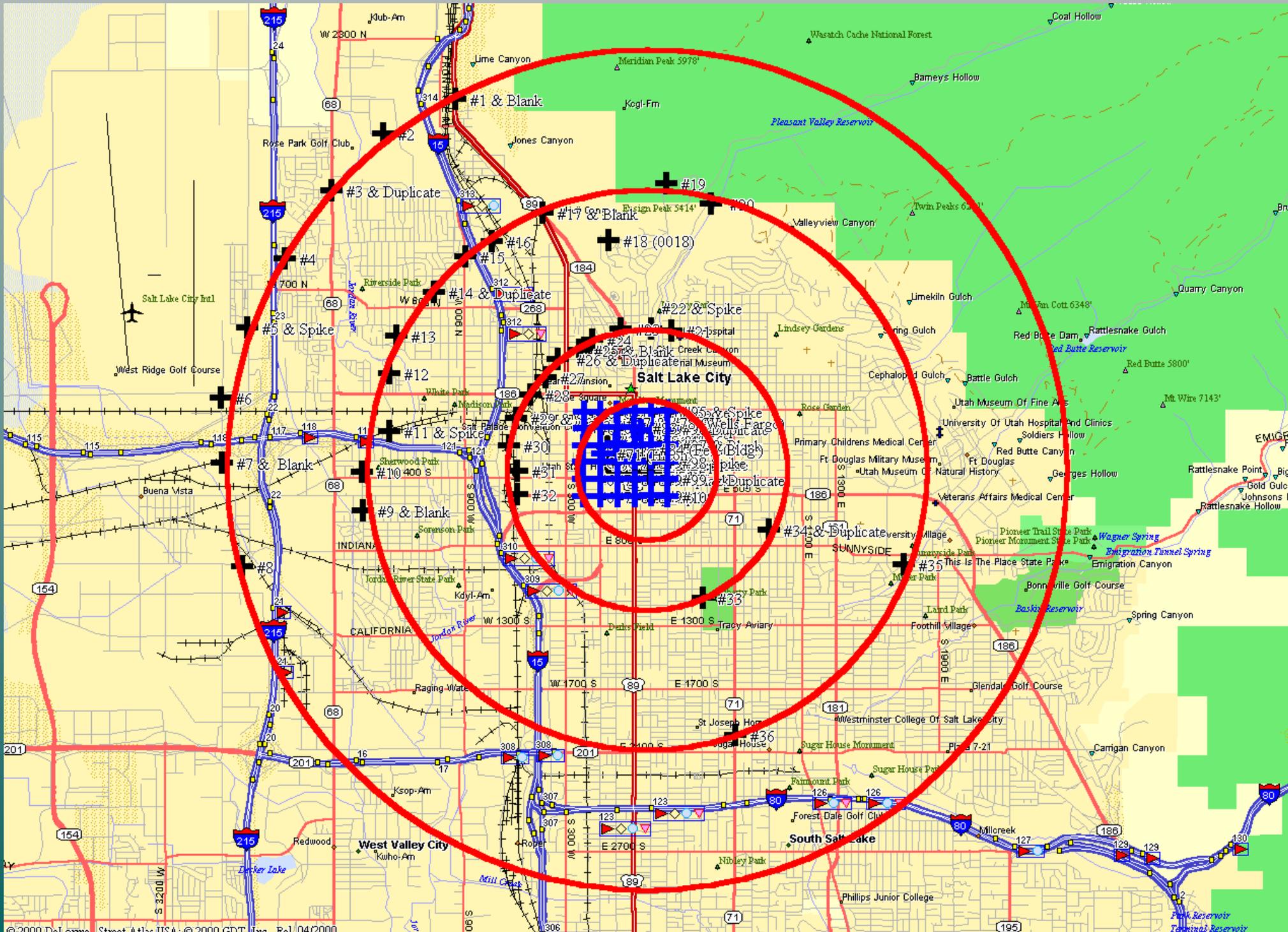
URBAN 2000 Post Deployment Briefing

Kirk L. Clawson, Ph.D.
Deputy Director &
Research Meteorologist
NOAA/ARLFRD
1750 Foote Dr.
Idaho Falls, ID 83402
526-2742, 526-2549 (fax)
Kirk.Clawson@noaa.gov

NOAA/FRD Deployment Tasks

- SF₆ Release
- Mobile SF₆ Analysis
- Stationary SF₆ Analysis
- Radar Profiler and SODAR
- 3-D Sonic Anemometers

SF₆ Experiment Domain—1,2,4,6 km Arcs



SF₆ Release

- 1 pretest, 5 regular tests, 1 SF₆ only test, and 1 perfluorocarbon only test
- Pretest release characteristics:
 - 2-one hour releases at 0100 and 0300 MDT
 - Release rates: 2 g s⁻¹ and 1 g s⁻¹, respectively
 - Line release
- First 4 regular tests
 - 3-one hour releases at 0100, 0300, and 0500 MDT
 - Release rate: 1 g s⁻¹
 - Line release
 - Simultaneous with perfluorocarbon tracers

SF₆ Release (cont.)

- Fifth test
 - Regular sampling time
 - Perfluorocarbon tracer only
- Sixth test
 - 3-one hour releases at 2200, 0000, and 0200 MDT
 - Release rate: 2 g s⁻¹
 - Point source release
 - No perfluorocarbon tracers
- Seventh test
 - 3-one hour releases at 0100, 0300, and 0500 MDT
 - Release rate: 1 g s⁻¹
 - Point source release
 - Simultaneous with perfluorocarbon tracers

SF₆ Release RV



SF₆ Line Release



SF₆ Line Release



SF₆ Point Source Release

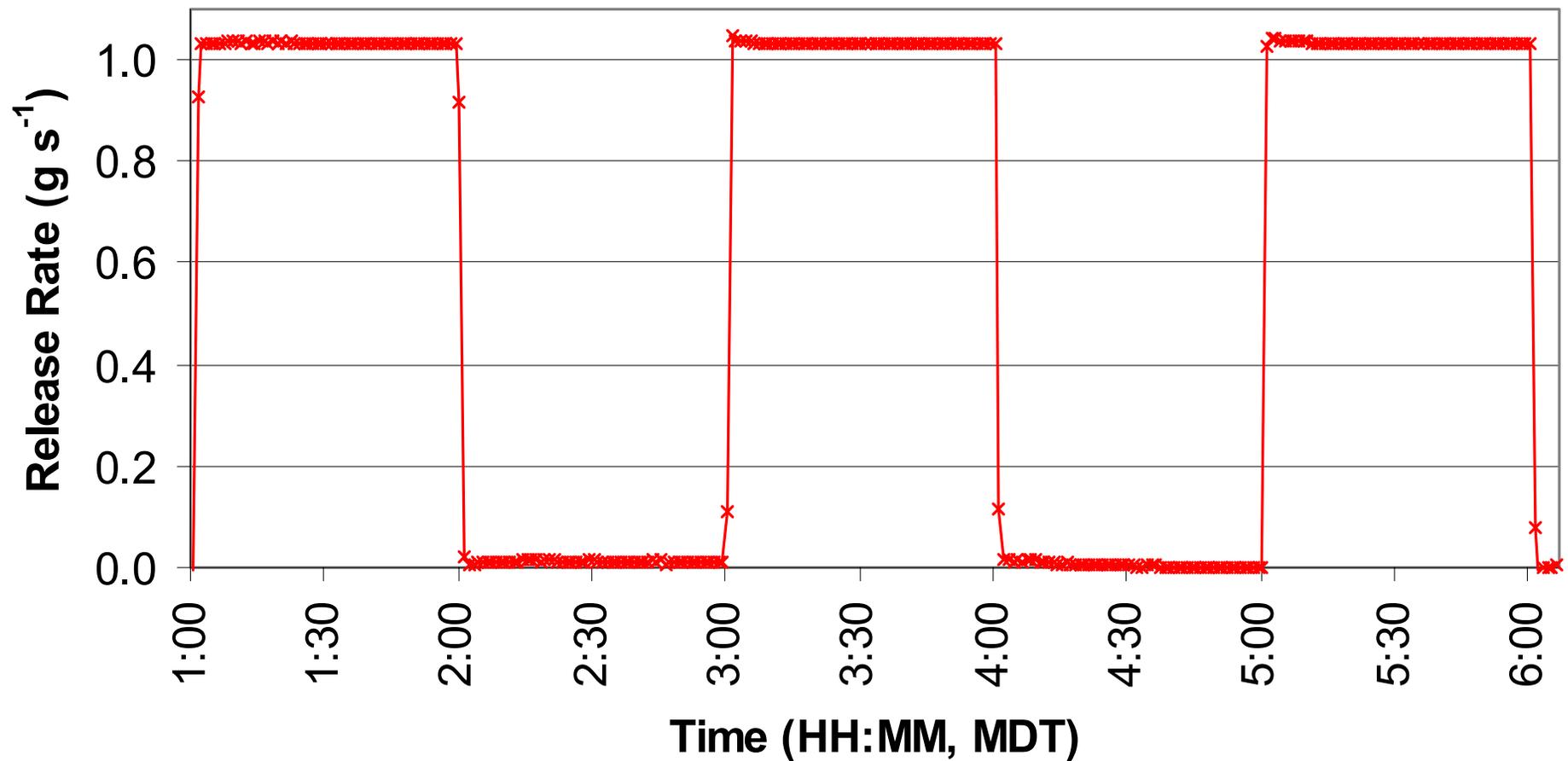


SF₆ Release RV (inside)



Typical SF₆ Release Rate

Test 1 SF6 Release - October 7, 2000



Mobile SF₆ Analysis

- TGA-4000 from Scientech
 - Electron capture detector
 - Range: 20 pptv to 20 ppbv
 - Recorded at 4 Hz
 - Combined with GPS for position
 - Concentrations displayed in strip chart fashion
- Real-time reporting of plume position and concentration
 - On-the-fly repositioning of detection equipment

Mobile SF₆ Analysis (cont.)

- Both mobile and stationary
 - Stationary for plume concentration fluctuations
 - Mobile for plume centerline locations
- 4 mobile analyzers
 - Operator and driver
 - Drivers from NOAA, LANL and PNNL
- 2 stationary analyzers
 - Operator only

Mobile SF₆ Analyzer—TGA & Computer



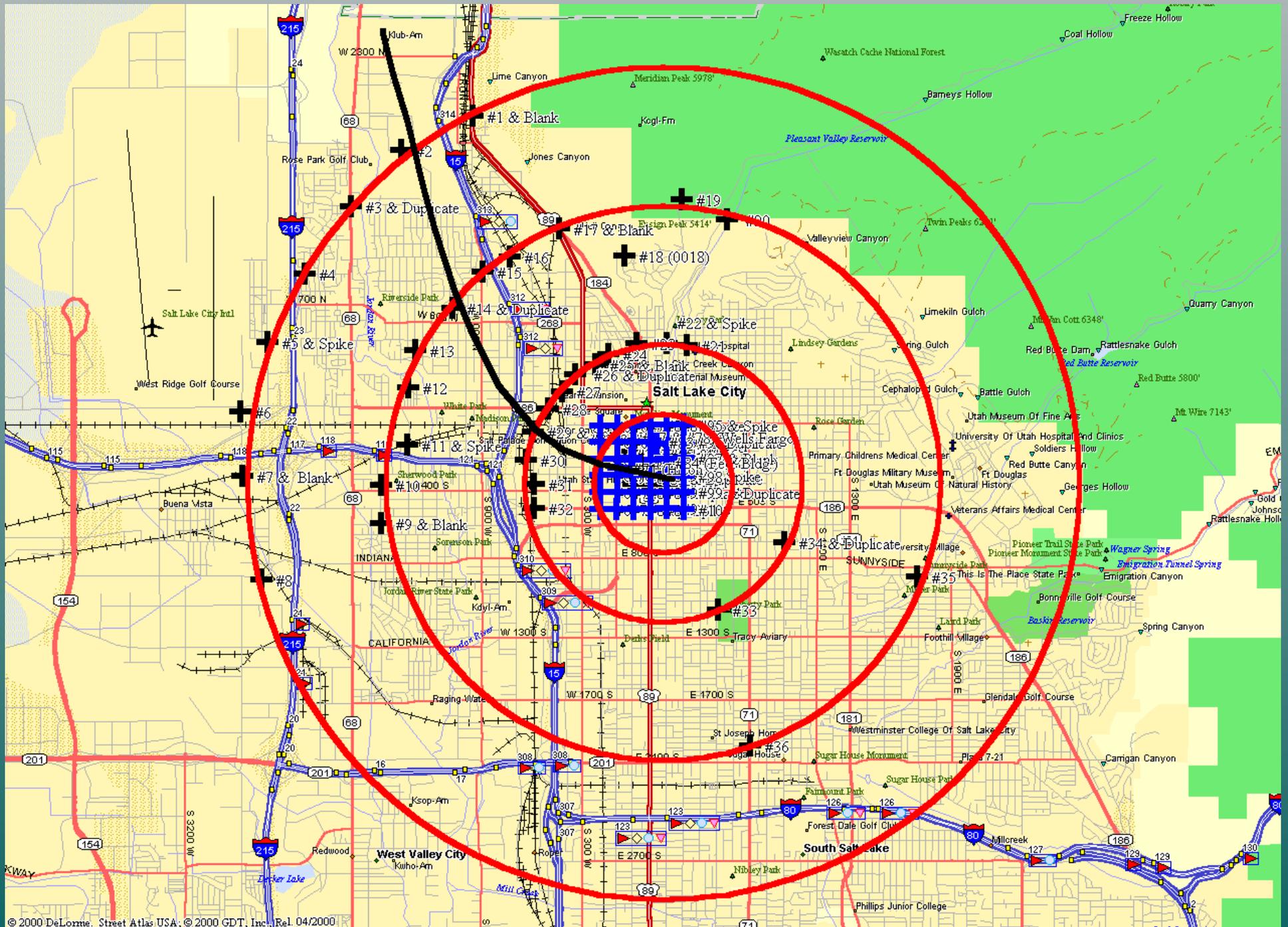
Mobile SF₆ Analyzer in Van



Mobile SF₆ Analyzer Fleet



Typical SF₆ Plume Track from Vans



Stationary SF₆ Analysis

- Programmable air sampler
- One-liter Tedlar® bags housed in a cartridge
- Twelve consecutive, integrated samples before the cartridge must be changed
- Bag fill time periods ranged from 15 minutes to 1 hour
- Powered by a single "D" cell (sufficient capacity for all 7 tests)

Air Sampler, Sample Cartridge, and Barcode Reader



Air Sampler Modified for CATS



Air Sampler Modified for CATS



Stationary SF₆ Analysis

- 40 SF₆ + perfluorocarbon samplers
- 60 SF₆ only samplers
- 10 duplicate SF₆ samplers
- 10 blank SF₆ samplers
- 10 control (spike) samplers
- Placed on every street corner downtown
- Mid-block locations near release
- Three building tops
- Arranged in 2, 4, and 6 km arcs in suburbs

Automated Analytical System

- Gas Chromatography
 - automated sampling
 - electron capture detection
- For SF₆:
 - range: 1 pptv to 200 ppbv
 - limit of detection: 20 pptv
 - limit of quantitation: 70 pptv
- Throughput with four GC's:
 - 16 cartridges/hr or
 - 200 samples/hr

Automated Analytical System



Stationary Sampling Results

- Analysis completed on tests 1-4
 - Concentrations range up to 300 ppbv
 - Only one sample > 200 ppbv
- 85% of highest concentrations were measured at sampler site just north of Wells Building
- Roof-top samples indicate concentrations as high as 7500 pptv (Test 3, Wells Fargo)
- Upwind samples on 2 and 4 km arcs as high as 250 pptv (Test 3, 1200 MDT)

Radar Profiler and SODAR

- Located at Raging Waters (1700 S 1200 W, 3 km SW of release site)
- 915 MHz Radar Profiler (Radian)
- 3000 Hz SODAR (Radian)
- 10-m Meteorological Tower
 - Wind speed and direction
 - Air temperature
 - Relative Humidity

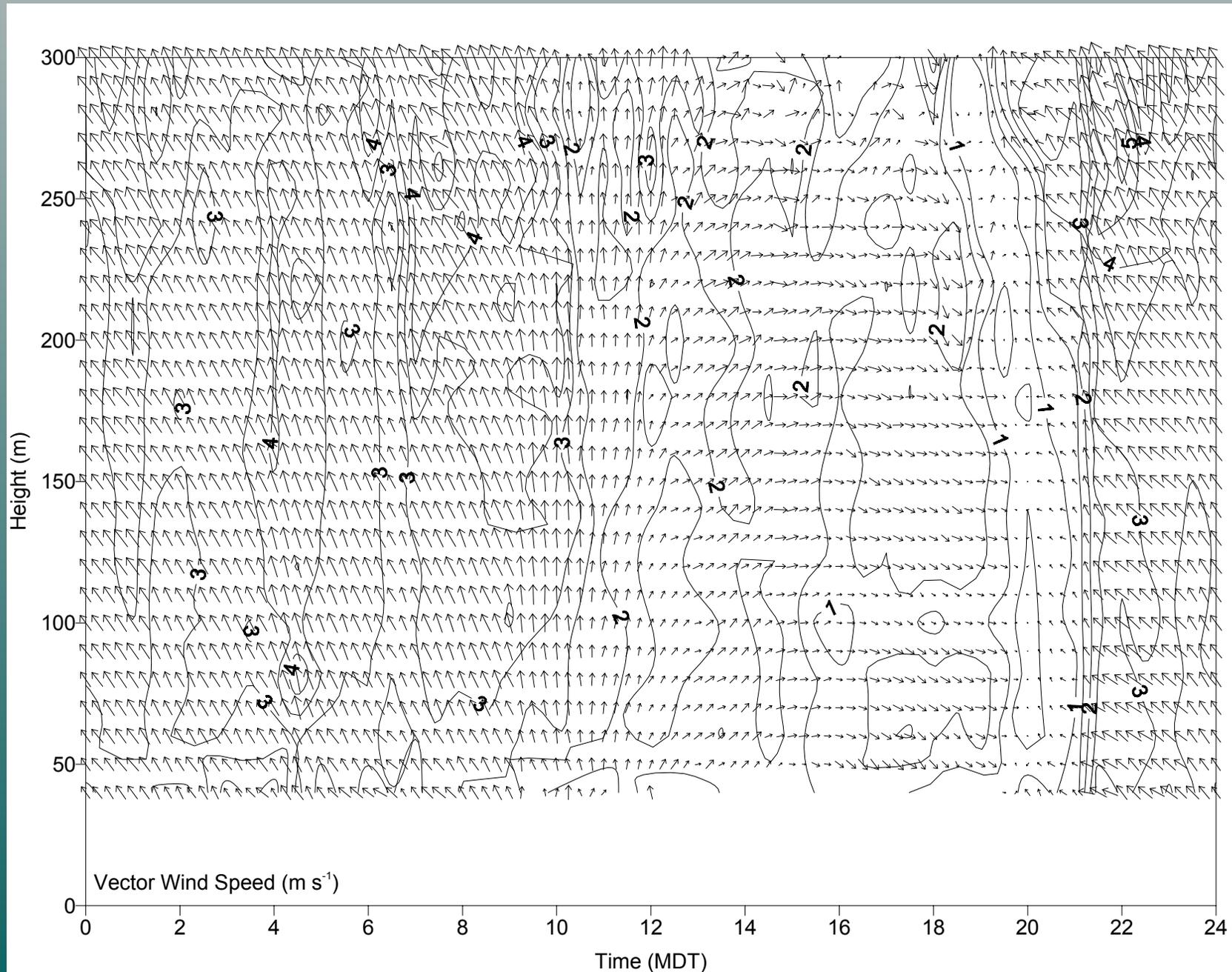
Radar Profiler and SODAR



Remote Sensor Results

- Operated without a glitch for entire experiment
- SODAR vector averages indicate a distinct diurnal flow reversal

SODAR Wind Vector Averages



Sonic Anemometers

- 3-D 10 Hz Gill and ATI anemometers
- Mounted on mobile tower in City Centre parking lot west of release site
- Heights: Approximately 21 and 30 ft. AGL

Mounted Sonic Anemometers



Problems Encounters

- Vandalism to Radar Profiler
 - Windows shattered by rocks
- Bomb squad disposal of stationary sampler



Work To Be Completed

- GC Analysis of stationary samples Tests 5-6
- QC of stationary samples
- QC of mobile analyzers
- QC of sonic anemometer data
- Preparation of data report and CD-ROMs